CITY OF ALBION (PWS 5160001)
SOURCE WATER ASSESSMENT FINAL REPORT

March 26, 2003

State of Idaho
Department of Environmental Quality

Executive Summary

Under the Safe Drinking Water Act Amendments of 1996, all states are required by the U.S. Environmental Protection Agency (EPA) to assess every source of public drinking water for its relative sensitivity to contaminants regulated by the act. This assessment is based on a land use inventory of the designated assessment area, sensitivity factors associated with the wells, and aquifer characteristics.

This report, *Source Water Assessment for the City of Albion, Idaho,* describes the public drinking water system, the boundaries of the zones of water contribution, and the associated potential contaminant sources located within these boundaries. This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. **The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The City of Albion drinking water system (PWS 5160001) consists of three ground water well sources. All of the wells are located in Cassia County within the city limits of Albion. Well #1 is located on the northern edge of the city park. Well #2 is located on Vaughan Street near the center of town. Well #3 is located on the northwest side of Albion near the Pleasant Hill Cemetery. (See figure 1) Water from the wells is stored in a 270,000-gallon reinforced concrete reservoir located about one-quarter of a mile northwest of the city in a fenced, locked enclosure. Pumps are not required to distribute the water since the storage reservoir sits higher than the city. Hypochlorinators are available for use at Well #2 and Well #3. However, disinfection is rarely used. The water system upgraded their distribution system and their wells in 1992. The system currently serves 310 people through 168 connections.

Final susceptibility scores are derived from equally weighing system construction scores, hydrologic sensitivity scores, and potential contaminant/land use scores. Therefore, a low rating in one or two categories coupled with a higher rating in other categories results in a final rating of low, moderate, or high susceptibility. With the potential contaminants associated with most urban and heavily agricultural areas, the best score a well can get is moderate. Potential Contaminants/Land Uses are divided into four categories, inorganic contaminants (IOCs, e.g. nitrates, arsenic), volatile organic contaminants (VOCs, e.g. petroleum products), synthetic organic contaminants (SOCs, e.g. pesticides), and microbial contaminants (e.g. bacteria). As different wells can be subject to various contamination settings, separate scores are given for each type of contaminant.

In terms of overall susceptibility, Well #1 rated moderate for IOCs, VOCs, SOCs, and microbials. Hydrologic sensitivity and system construction rated moderate for the well. Land use scores in the well were high for IOCs, VOCs, and SOCs, and moderate for microbials.(Table 1)

In terms of overall susceptibility, Well #2 rated high for IOCs, VOCs, and SOCs, and moderate for microbials. Hydrologic sensitivity and system construction rated moderate for the well. Land use scores in the well were high for IOCs, VOCs, and SOCs, and moderate for microbials. (Table 1)

In terms of overall susceptibility, Well #3 rated high for IOCs, VOCs, SOCs, and microbials. Hydrologic sensitivity and system construction rated high for the well. Land use scores were high for IOCs, VOCs, and SOCs, and moderate for microbials.(Table 1)

There are no significant water chemistry issues affecting the City of Albion wells. From December 1992 to November 2002, total coliform bacteria were detected in the distribution system with confirmed detections in March, May, and June 1996 and again in October 2002. A single detection of total coliform bacteria was recorded at Well #2 in October 1998. However, no coliform bacteria detections have been recorded at the other wells.

Traces of the IOCs fluoride, arsenic, barium, and nitrate have been detected in all of the wells with a trace detection of cyanide in Well #3. The radionuclides alpha and beta particles as well as radium have been detected in the drinking water system. While not a concern at this point, the wells exist in a region of high nitrogen fertilizer use, high countywide agricultural chemical use, and high countywide herbicide use.

This assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what ranking a source receives, protection is always important. Whether the sources are currently located in a "pristine" area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

For the City of Albion, drinking water protection activities should first focus on maintaining the requirements of the sanitary survey (an inspection conducted every five years with the purpose of determining the physical condition of a water system's components and its capacity). If microbial contamination becomes a problem, the City of Albion may want to consider implementing a routine disinfection program. Any spills that occur within the delineated area should be carefully monitored, as should any future development. Practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. No chemicals should be stored or applied within a 50-foot radius of the wellheads. Providing the appropriate agencies with a well log for Well #3 and any construction updates will assist in creating an effective drinking water protection plan. As most of the designated areas are outside the direct jurisdiction of the City of Albion, making partnerships with state and local agencies and industry groups are critical to success of drinking water protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near both urban and residential land uses. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. There is a major transportation corridor through the delineated areas; therefore, the State Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting), or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Twin Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

SOURCE WATER ASSESSMENT FOR CITY OF ALBION, IDAHO

Section 1. Introduction - Basis for Assessment

The following sections contain information necessary to understand how and why this assessment was conducted. **It is important to review this information to understand what the rankings of this assessment mean.** Maps showing the delineated source water assessment areas and the inventory of significant potential sources of contamination identified within those areas are attached. The lists of significant potential contaminant source categories and their rankings, used to develop this assessment, are also attached.

Level of Accuracy and Purpose of the Assessment

The Idaho Department of Environmental Quality (DEQ) is required by the EPA to assess the over 2,900 public drinking water sources in Idaho for their relative susceptibility to contaminants regulated by the Safe Drinking Water Act. This assessment is based on a land use inventory of the delineated assessment area, sensitivity factors associated with the wells, and aquifer characteristics. All assessments must be completed by May of 2003. The resources and time available to accomplish assessments are limited. Therefore, an in-depth, site-specific investigation to identify each significant potential source of contamination for every public water system is not possible. **This assessment should be used as a planning tool, taken into account with local knowledge and concerns, to develop and implement appropriate protection measures for this source. The results should <u>not be</u> used as an absolute measure of risk and they should <u>not be</u> used to undermine public confidence in the water system.**

The ultimate goal of this assessment is to provide data to local communities to develop a protection strategy for their drinking water supply system. The Idaho DEQ recognizes that pollution prevention activities generally require less time and money to implement than treating a public water supply system once it has been contaminated. DEQ encourages communities to balance resource protection with economic growth and development. The decision as to the amount and types of information necessary to develop a drinking water protection program should be determined by the local community based on its own needs and limitations. Drinking water protection is one facet of a comprehensive growth plan, and it can complement ongoing local planning efforts.

Section 2. Conducting the Assessment

General Description of the Source Water Quality

The City of Albion drinking water system (PWS 5160001) consists of three ground water well sources. All of the wells are located in Cassia County within the city limits of Albion (Figure 1). Well #1 is located on the northern edge of the city park. Well #2 is located on Vaughan Street near the center of town. Well #3 is located on the northwest side of Albion near the Pleasant Hill Cemetery. Water from the wells is stored in a 270,000-gallon reinforced concrete reservoir located about one-quarter of a mile northwest of the city in a fenced, locked enclosure. Hypochlorinators are available for use at Well #2 and Well #3. However, disinfection is rarely used. The system currently serves 310 people through 168 connections.

There are no significant water chemistry issues affecting the City of Albion wells. From December 1992 to November 2002, total coliform bacteria were detected in the distribution system with confirmed detections in March, May, and June 1996 and again in October 2002. A single detection of total coliform bacteria was recorded at Well #2 in October 1998. However, no coliform bacteria detections have been recorded at the other wells.

Traces of the IOCs fluoride, arsenic, barium, and nitrate have been detected in all of the wells with a trace detection of cyanide in Well #3. The radionuclides alpha and beta particles as well as radium have been detected in the drinking water system. While not a concern at this point, the wells exist in a region of high nitrogen fertilizer use, high countywide agricultural chemical use, and high countywide herbicide use.

Defining the Zones of Contribution – Delineation

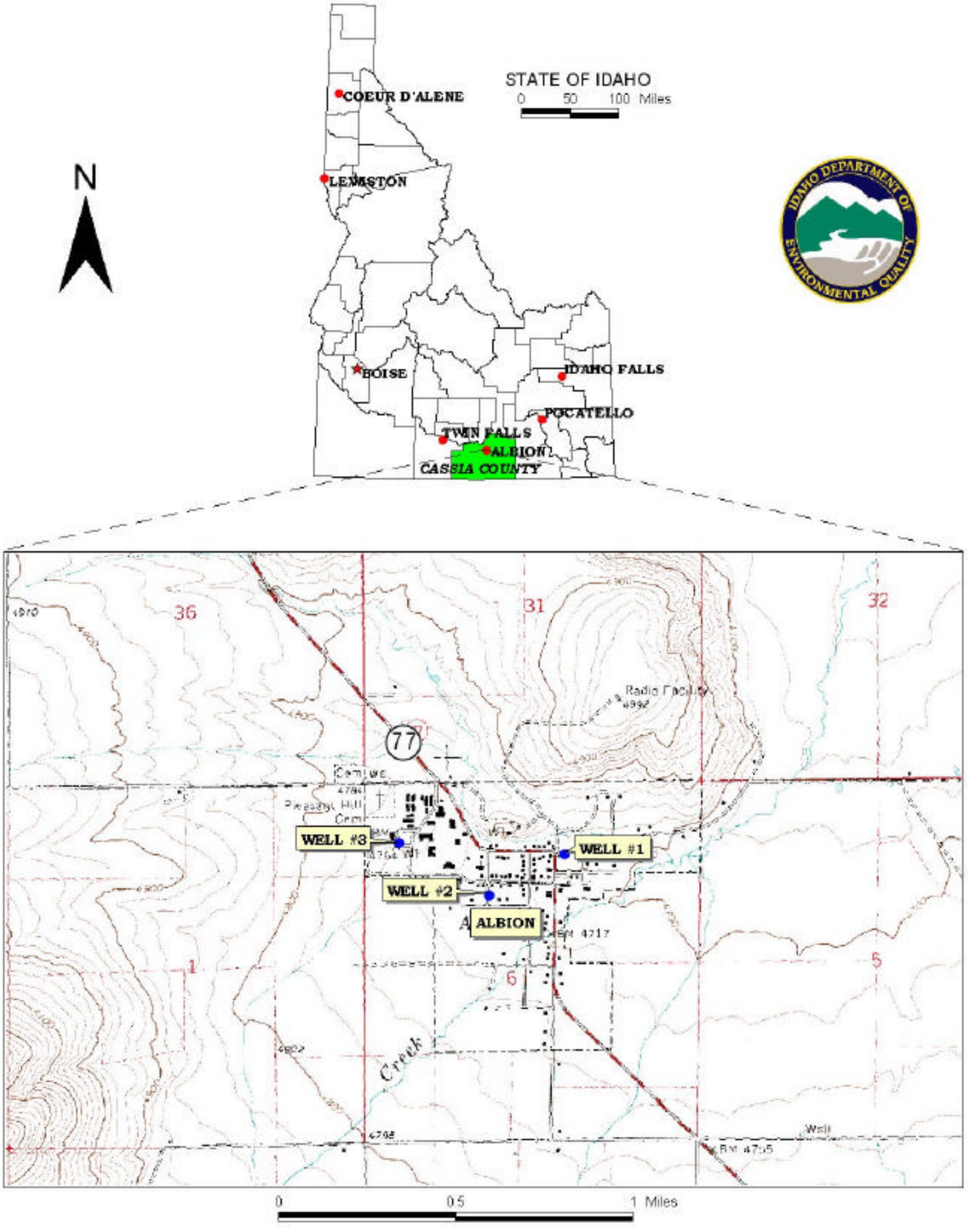
The delineation process establishes the physical area around a well that will become the focal point of the assessment. The process includes mapping the boundaries of the zone of contribution into time-of-travel zones (zones indicating the number of years necessary for a particle of water to reach a well) for water in the aquifer.

DEQ used a refined computer model approved by the EPA in determining the time-of-travel (TOT) zones for water associated with the aquifer south of the Snake River in the vicinity of the City of Albion. The computer model used site-specific data, assimilated by DEQ from a variety of sources including local area well logs and hydrogeologic information summarized below.

The wells extract water from a sandstone aquifer that was identified on the Well #2 well log as beginning at about 45 feet below ground surface (bgs) and continuing down to 710 feet bgs. Sanitary survey information (DEQ, 1999) indicates that the maximum production for the system is 500,000 gallons per day, which equal 347 gallons per minute (gpm). Using a growth factor of 1.5, the models were run allowing for 521 gpm to be pumped from the aquifers. Well information indicates that the capacity of the wells equals 843 gpm, so the models account for 62% of the capacity of the wells. The models were run at 62% of the capacity of each well.

The boundary conditions used for the WhAEM2000 (Kraemer et al., 2000) included the topographic watershed of Marsh Creek and Land Creek to the west and southwest in the Albion Range, the intermittant streams to the south, and Howell Creek to the east and southeast. Local area domestic wells were evaluated to determine hydrogeologic properties of the aquifers as well as determining general direction and gradient of the water table.

FIGURE 1. Geographic Location of the City of Albion



Domestic well specific capacity tests indicated a hydraulic conductivity range of 4 to 92 feet per day with an average of 48 feet per day. Producing zones for these wells ranged from 3 to 45 feet with an average of 19 feet. Though the average rainfall in the area is about 14 inches per year, the depth of the wells and the low permeability formations likely prevent significant areal recharge from occurring.

Six domestic wells were used as test points during the calibration of the model. The test wells were installed from 1988 to 2002 and range in depth from 173 feet deep to 745 feet deep. Water was added to the model at the top of the watersheds at rates that matched the test points used.

Since the City of Albion Well #2 is significantly deeper then the other two wells, modeling simulations were conducted for Well #2 individually. In addition, the Well #2 well was modeled at 300 gpm, or 62% of its 480 gpm capacity. Wells #1, at 89 gpm, and Well #3, at 132 gpm, were modeled together allowing for well interference effects to come into play. In each case, the boundary conditions defining the Marsh Creek and Land Creek watersheds played a significant role in causing the flow paths to have a southwesterly aspect.

The delineated source water assessment area for Well #1 is a southward trending corridor approximately 1.5 miles long and 1.25 miles wide (Figure 2, Appendix A). The delineated source water assessment area for Well #2 is a large half-circular area that extends southward for approximately 1.75 miles and is approximately 2 miles wide (Figure 3, Appendix A). The delineated source water assessment area for Well #3 is an oval-shaped area that extends westward from the well for approximately 1.25 miles and extends southward for approximately 1.5 miles (Figure 4, Appendix A). The actual data used by DEQ in determining the source water assessment delineation areas is available from DEQ upon request.

Identifying Potential Sources of Contamination

A potential source of contamination is defined as any facility or activity that stores, uses, or produces, as a product or by-product, the contaminants regulated under the Safe Drinking Water Act and has a sufficient likelihood of releasing such contaminants at levels that could pose a concern relative to drinking water sources. The goal of the inventory process is to locate and describe those facilities, land uses, and environmental conditions that are potential sources of ground water contamination. The locations of potential sources of contamination within the delineation areas were obtained by field surveys conducted by DEQ, the City of Albion, and from available databases.

The dominant land uses surrounding the City of Albion's delineations is urban and irrigated agriculture.

It is important to understand that a release may never occur from a potential source of contamination provided best management practices are used at the facility. Many potential sources of contamination are regulated at the federal level, state level, or both, to reduce the risk of release. Therefore, when a business, facility, or property is identified as a potential contaminant source, this should not be interpreted to mean that this business, facility, or property is in violation of any local, state, or federal environmental law or regulation. What it does mean is that the potential for contamination exists due to the nature of the business, industry, or operation. There are a number of methods that water systems can use to work cooperatively with potential sources of contamination, such as educational visits and inspections of stored materials. Many owners of such facilities may not even be aware that they are located near a public water supply well.

Contaminant Source Inventory Process

A contaminant inventory of the study area was conducted in November and December 2002. This involved identifying and documenting potential contaminant sources within the City of Albion Source Water Assessment Areas through the use of field surveys, computer databases, and Geographic Information System maps developed by DEQ.

The delineation for Well #1 of the City of Albion has 10 potential contaminant sources identified by computer databases. These sources include underground storage tanks (USTs), leaking underground storage tanks (LUSTs), a dairy, gas stations, a landfill, and a tire repair business. The GIS map shows Highway 77 and Marsh Creek as sources that contribute contaminants to the aquifer in an accidental event of a spill or release. Additionally, the 1995 Ground Water Under Direct Influence (GWUDI) field survey shows a drainage ditch and a sewer line that runs within 100 feet of the wellhead. These sources can also contribute contaminants to the aquifer. A map with the Well #1 location, delineated areas, and potential contaminant sources are provided with this report (Figure 2, Table 2, Appendix A).

The delineation for Well #2 of the City of Albion has 13 potential contaminant sources identified by computer databases. These sources include USTs, LUSTs, a dairy, gas stations, a landfill, and a wastewater land application (WLAP) site. The GIS map shows that Highway 77 and Marsh Creek also pass through the delineation for Well #2, potentially contributing contaminants to the aquifer in the event of an accidental spill or release. The 1995 GWUDI field survey shows that a drainage ditch and a sewer line as well as Vaughn Street, Marie Street, Whitman Street, and Olsen Street run through the 0-3 TOT zone of the delineation. These sources can also contribute contaminants to the aquifer. A map with the Well #2 location, delineated areas, and potential contaminant sources are provided with this report (Figure 3, Table 3, Appendix A).

The delineation for Well #3 of the City of Albion has 2 potential contaminant sources identified by the computer databases. These sources include a landfill that crosses the 6-year and 10-year TOT zones. The GIS map shows Highway 77 and Marsh Creek as sources that contribute contaminants to the aquifer in an accidental event of a spill or release. Additionally, the 1995 GWUDI field survey shows a drainfield that runs within 100 feet of the wellhead. This source can also contribute contaminants to the well water if the well is not fully protected from leaching chemicals in the soil. A map with the Well #3 location, delineated areas, and potential contaminant sources are provided with this report (Figure 4, Table 4, Appendix A).

Section 3. Susceptibility Analyses

The susceptibility of each well to contamination was ranked as high, moderate, or low risk according to the following considerations: hydrologic characteristics, physical integrity of the well, land use characteristics, and potentially significant contaminant sources. The susceptibility rankings are specific to a particular potential contaminant or category of contaminants. Therefore, a high susceptibility rating relative to one potential contaminant does not mean that the water system is at the same risk for all other potential contaminants. The relative ranking that is derived for each well is a qualitative, screening-level step that, in many cases, uses generalized assumptions and best professional judgement. Appendix B contains the susceptibility analysis worksheets. The following summaries describe the rationale for the susceptibility ranking.

Well Hydrologic Sensitivity

The hydrologic sensitivity of a well is dependent upon four factors: the surface soil composition, the material in the vadose zone (between the land surface and the water table), the depth to first ground water, and the presence of a 50-foot thick fine-grained zone (aquitard) above the producing zone of the well. Slowly draining soils such as silt and clay typically are more protective of ground water than coarse-grained soils such as sand and gravel. Similarly, fine-grained sediments in the subsurface and a water depth of more than 300 feet protect the ground water from contamination.

The hydrologic sensitivity was moderate for Well #1 and Well #2 and it was high for Well #3. The moderate hydrologic sensitivity score for Well #1 was based upon poor to moderately drained soil classes as defined by the National Resource Conservation Service (NRCS). Poor to moderately draining soils tend to impede the migration of contaminants to the aquifer. Additionally, the vadose zone for Well #1 was composed mostly of clay, a low permeable soil that also impedes the downward migration of contaminants. The moderate hydrologic sensitivity score for Well #2 is due to the presence of several clay layers that formed an aquitard above the producing zone of the well. However, the soil classes for both Well #2 and Well #3 were classified as moderate to well drained soils. These soils do not reduce the downward migration of contaminants. Also, the vadose zone of Well #2 was composed predominantly of high permeable sands and gravels. First ground water was found at very shallow depths for both Well #1 and Well #2: between 11 and 15 feet below ground surface (bgs). The high hydrologic sensitivity score for Well #3 was due to the unavailability of the well log, restricting the information concerning the composition of the vadose zone, first depth to ground water, and the presence of an aquitard.

Well Construction

Well construction directly affects the ability of the well to protect the aquifer from contaminants. System construction scores are reduced when information shows that potential contaminants will have a more difficult time reaching the intake of the well. Lower scores imply a system is less vulnerable to contamination. For example, if the well casing and annular seal both extend into a low permeability unit, then the possibility of contamination is reduced and the system construction score goes down. If the highest production interval is more than 100 feet below the water table, then the system is considered to have better buffering capacity. If the wellhead and surface seal are maintained to standards, as outlined in Sanitary Surveys, then contamination down the well bore is less likely. If the well is protected from surface flooding and is outside the 100-year floodplain, then contamination from surface events is reduced.

All of the City of Albion wells have a moderately susceptible system construction. The 1999 sanitary survey indicates that the wellhead and surface seals of each well are maintained to standards and that all of the wells have proper casing vents. It also indicates that the wells are properly protected from surface flooding and all of the wells are located outside a 100-year floodplain. For different reasons, it was impossible to determine if the annular seal and casing of each well extended to a low permeability unit or if the highest production zone of each well is located at least 100 feet below the static water level. The well log for Well #1 did not provide enough information concerning the placement of the casing or the location of the highest producing zone. The well log for Well #2 was illegible in certain places and it did not provide a static water depth. The well log for Well #3 was unavailable, limiting any data concerning the construction of the well.

The Idaho Department of Water Resources *Well Construction Standards Rules* (1993) require all Public Water Systems (PWSs) to follow DEQ standards as well. IDAPA 58.01.08.550 requires that PWSs follow the *Recommended Standards for Water Works* (1997) during construction. Some of the requirements include casing thickness, well tests, and depth and formation type that the surface seal must be installed into. Table 1 of the *Recommended Standards for Water Works* (1997) lists the required steel casing thickness for various diameter wells. Ten-inch diameter wells require a casing thickness of 0.365 inches and fourteen-inch diameter wells require a casing thickness of at least 0.375 inches. Well tests are required at the design pumping rate for 24 hours or until stabilized drawdown has continued for at least six hours when pumping at 1.5 times the design pumping rate. A point was added to each well's score because they do not meet all current construction standards. Though the wells may have met standards at their time of construction, current construction standards are stricter. In this case, there was insufficient information to determine if the wells meet construction standards.

Potential Contaminant Source and Land Use

All of the City of Albion wells rated high for IOCs (e.g. arsenic, nitrate), VOCs (e.g. petroleum products), and SOCs (e.g. pesticides), and moderate for microbial contaminants (e.g. bacteria). The irrigated agricultural land within the delineations of the wells, the high countywide nitrogen, herbicide, and agricultural chemical use, as well as the highway and creek that pass through all three TOT zones of the delineations contributed to the overall potential contaminant source inventory/land use of the wells.

Final Susceptibility Rating

An IOC detection above a drinking water standard MCL, any detection of a VOC or SOC, or a detection of total coliform bacteria or fecal coliform bacteria at the wellhead will automatically give a high susceptibility rating to a well, despite the land use of the area, because a pathway for contamination already exists. Additionally, the storage or application of any potential contaminants within 50 feet of the wellhead will automatically lead to a high score. Hydrologic sensitivity and system construction scores are heavily weighted in the final scores. Having multiple potential contaminant sources in the 0- to 3-year time-of-travel zone (Zone 1B) and much agricultural land use contribute greatly to the overall ranking. In terms of total susceptibility for the wells of the City of Albion, Well #1 has moderate susceptibility to the IOC, VOC, SOC, and microbial potential contaminants. Well #2 has high susceptibility to IOC, VOC, and SOC contaminants and moderate susceptibility to microbial contaminants. Well #3 has high susceptibility to IOC, VOC, SOC, and microbial contaminants.

Table 1. Summary of the City of Albion, Well Susceptibility Evaluation

Source	**Susceptibility Scores[1]**									
	Hydrologic Sensitivity	Contaminant Inventory				System Construction	**Final Susceptibility Ranking**			
		IOC	VOC	SOC	Microbials		IOC	VOC	SOC	Microbials
Well #1	M	H	H	H	M	M	M	M	M	M
Well #2	M	H	H	H	M	M	H	H	H	M
Well #3	H	H	H	H	M	M	H	H	H	H

[1]H = High Susceptibility, M = Moderate Susceptibility, L = Low Susceptibility
IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Susceptibility Summary

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In terms of overall susceptibility, Well #1 rated moderate for IOCs, VOCs, and SOCs, and microbials. Hydrologic sensitivity and system construction rated moderate for the well. Land use scores in the well were high for IOCs, VOCs, and SOCs, and moderate for microbials.

In terms of overall susceptibility, Well #2 rated high for IOCs, VOCs, and SOCs, and moderate for microbials. Hydrologic sensitivity and system construction rated moderate for the well. Land use scores in the well were high for IOCs, VOCs, and SOCs, and moderate for microbials.

In terms of overall susceptibility, Well #3 rated high for IOCs, VOCs, SOCs, and microbials. Hydrologic sensitivity and system construction rated high for the well. Land use scores were high for IOCs, VOCs, and SOCs, and moderate for microbials.

Section 4. Options for Drinking Water Protection

The susceptibility assessment should be used as a basis for determining appropriate new protection measures or re-evaluating existing protection efforts. No matter what the susceptibility ranking a source receives, protection is always important. Whether the source is currently located in a “pristine” area or an area with numerous industrial and/or agricultural land uses that require surveillance, the way to ensure good water quality in the future is to act now to protect valuable water supply resources.

An effective drinking water protection program is tailored to the particular local drinking water protection area. A community with a fully developed drinking water protection program will incorporate many strategies, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For the City of Albion, drinking water protection activities should first focus on maintaining the requirements of the sanitary survey. If microbial contamination becomes a problem, the City of Albion may want to consider implementing a disinfecting program. Any spills that occur within the delineated area should be carefully monitored, as should any future development. Practices aimed at reducing the leaching of agricultural chemicals from agricultural land within the designated source water areas should be implemented. No chemicals should be stored or applied within a 50-foot radius of the wellheads. Providing the appropriate agencies with a well log for Well #3 and any construction updates will assist in creating an effective drinking water protection plan. As most of the designated areas are outside the direct jurisdiction of the City of Albion, making partnerships with state and local agencies and industry groups are critical to success of drinking water protection.

Due to the time involved with the movement of ground water, drinking water protection activities should be aimed at long-term management strategies even though these strategies may not yield results in the near term. A strong public education program should be a primary focus of any drinking water protection plan as the delineations are near both urban and residential land uses. Public education topics could include proper lawn and garden care practices, household hazardous waste disposal methods, proper care and maintenance of septic systems, and the importance of water conservation to name but a few. There are multiple resources available to help communities implement protection programs, including the Drinking Water Academy of the EPA. There is a major transportation corridor through the delineations; therefore, the State Department of Transportation should be involved in protection activities. Drinking water protection activities for agriculture should be coordinated with the Idaho State Department of Agriculture, the Soil Conservation Commission, the local Soil Conservation District, and the Natural Resources Conservation Service.

A system must incorporate a variety of strategies in order to develop a comprehensive drinking water protection plan, be they regulatory in nature (e.g. zoning, permitting) or non-regulatory in nature (e.g. good housekeeping, public education, specific best management practices). For assistance in developing protection strategies please contact the Twin Falls Regional Office of the Idaho Department of Environmental Quality or the Idaho Rural Water Association.

Assistance

Public water suppliers and others may call the following DEQ offices with questions about this assessment and to request assistance with developing and implementing a local protection plan. In addition, draft protection plans may be submitted to the DEQ office for preliminary review and comments.

Twin Falls Regional DEQ Office	(208) 736-2190
State DEQ Office	(208) 373-0502

Website: http://www.deq.state.id.us

Water suppliers serving fewer than 10,000 persons may contact Melinda Harper, mlharper@idahoruralwater.com, Idaho Rural Water Association, at 1-208-343-7001 for assistance with drinking water protection (formerly wellhead protection) strategies.

POTENTIAL CONTAMINANT INVENTORY
LIST OF ACRONYMS AND DEFINITIONS

AST (Aboveground Storage Tanks) – Sites with aboveground storage tanks.

Business Mailing List – This list contains potential contaminant sites identified through a yellow pages database search of standard industry codes (SIC).

CERCLIS – This includes sites considered for listing under the **Comprehensive Environmental Response Compensation and Liability Act (CERCLA)**. CERCLA, more commonly known as Superfund is designed to clean up hazardous waste sites that are on the national priority list (NPL).

Cyanide Site – DEQ permitted and known historical sites/facilities using cyanide.

Dairy – Sites included in the primary contaminant source inventory represent those facilities regulated by Idaho State Department of Agriculture (ISDA) and may range from a few head to several thousand head of milking cows.

Deep Injection Well – Injection wells regulated under the Idaho Department of Water Resources generally for the disposal of stormwater runoff or agricultural field drainage.

Enhanced Inventory – Enhanced inventory locations are potential contaminant source sites added by the water system. These can include new sites not captured during the primary contaminant inventory, or corrected locations for sites not properly located during the primary contaminant inventory. Enhanced inventory sites can also include miscellaneous sites added by the Idaho Department of Environmental Quality (DEQ) during the primary contaminant inventory.

Floodplain – This is a coverage of the 100year floodplains.

Group 1 Sites – These are sites that show elevated levels of contaminants and are not within the priority one areas.

Inorganic Priority Area – Priority one areas where greater than 25% of the wells/springs show constituents higher than primary standards or other health standards.

Landfill – Areas of open and closed municipal and non-municipal landfills.

LUST (Leaking Underground Storage Tank) – Potential contaminant source sites associated with leaking underground storage tanks as regulated under RCRA.

Mines and Quarries – Mines and quarries permitted through the Idaho Department of Lands.

Nitrate Priority Area – Area where greater than 25% of wells/springs show nitrate values above 5mg/l.

NPDES (National Pollutant Discharge Elimination System) – Sites with NPDES permits. The Clean Water Act requires that any discharge of a pollutant to waters of the United States from a point source must be authorized by an NPDES permit.

Organic Priority Areas – These are any areas where greater than 25% of wells/springs show levels greater than 1% of the primary standard or other health standards.

Recharge Point – This includes active, proposed, and possible recharge sites on the Snake River Plain.

RICRIS – Site regulated under **Resource Conservation Recovery Act (RCRA)**. RCRA is commonly associated with the cradle to grave management approach for generation, storage, and disposal of hazardous wastes.

SARA Tier II (Superfund Amendments and Reauthorization Act Tier II Facilities) – These sites store certain types and amounts of hazardous materials and must be identified under the Community Right to Know Act.

Toxic Release Inventory (TRI) – The toxic release inventory list was developed as part of the Emergency Planning and Community Right to Know (Community Right to Know) Act passed in 1986. The Community Right to Know Act requires the reporting of any release of a chemical found on the TRI list.

UST (Underground Storage Tank) – Potential contaminant source sites associated with underground storage tanks regulated as regulated under RCRA.

Wastewater Land Applications Sites – These are areas where the land application of municipal or industrial wastewater is permitted by DEQ.

Wellheads – These are drinking water well locations regulated under the Safe Drinking Water Act. They are not treated as potential contaminant sources.

NOTE: Many of the potential contaminant sources were located using a geocoding program where mailing addresses are used to locate a facility. Field verification of potential contaminant sources is an important element of an enhanced inventory.

Where possible, a list of potential contaminant sites unable to be located with geocoding will be provided to water systems to determine if the potential contaminant sources are located within the source water assessment area.

References Cited

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Appendix A

City of Albion
Potential Contaminant Inventory

Figures 2, 3, and 4
Tables 2, 3, and 4

FIGURE 2. City of Albion Delineation Map and Potential Contaminant Source Locations

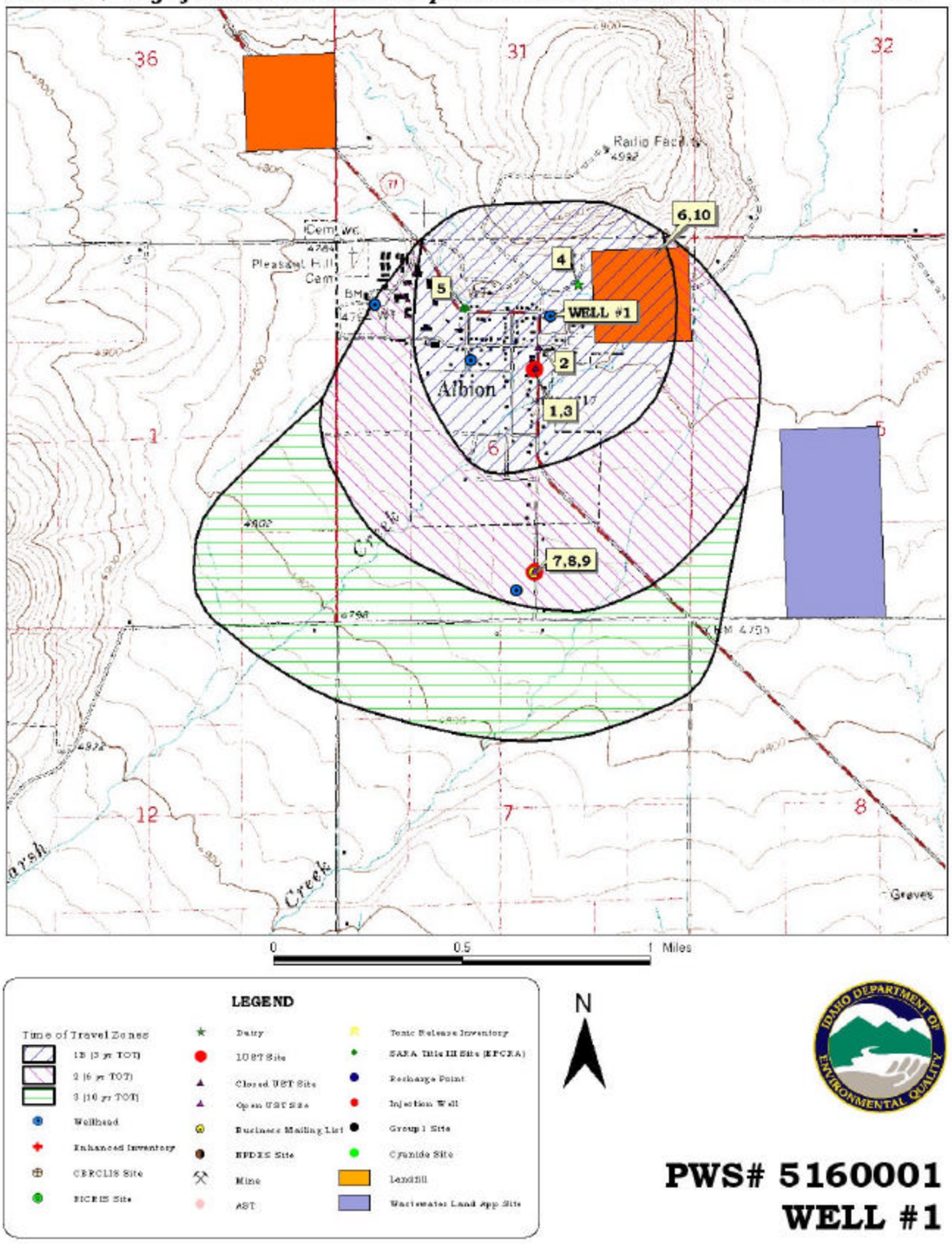
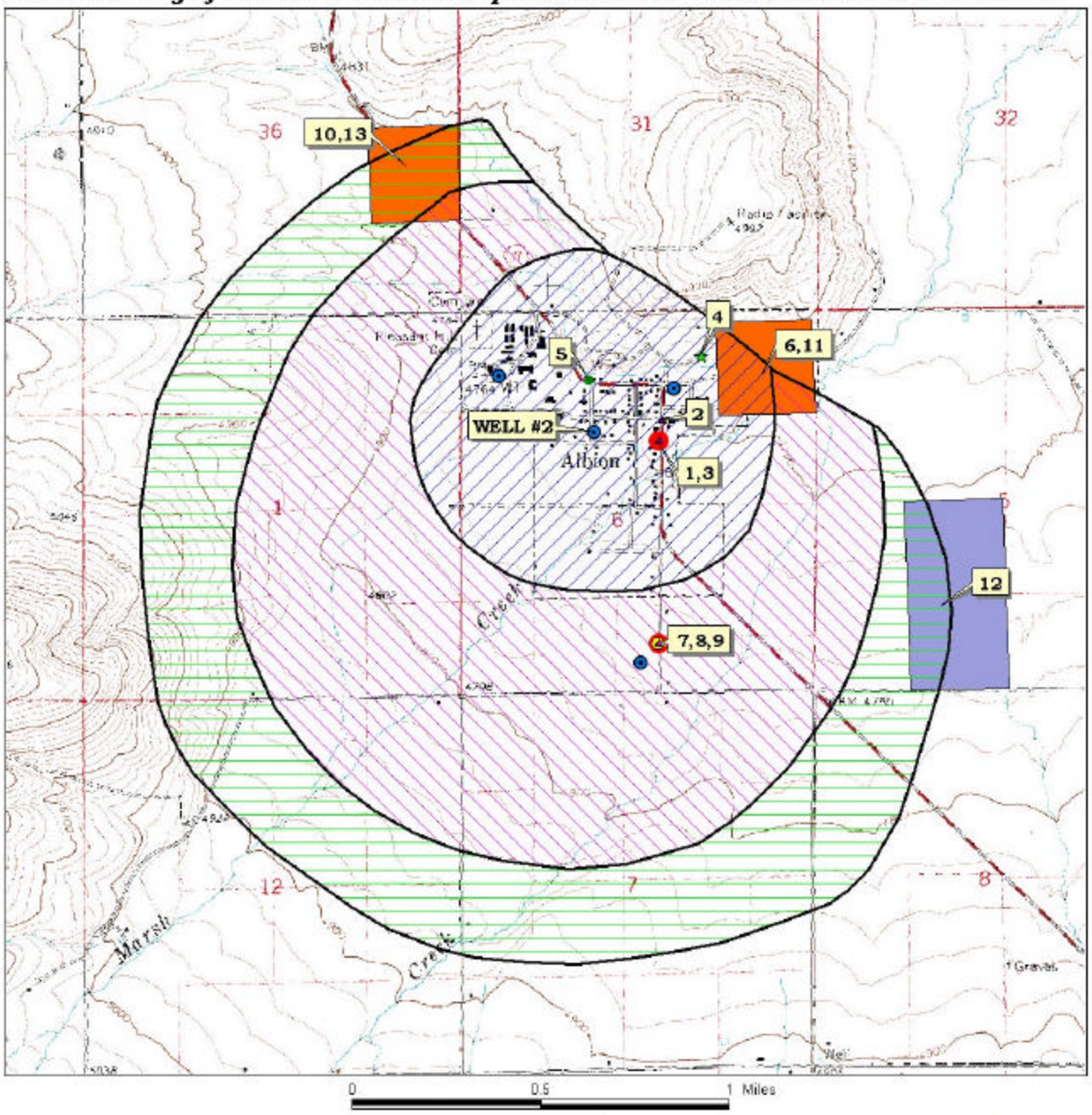


FIGURE 3. City of Albion Delineation Map and Potential Contaminant Source Locations



LEGEND

Time of Travel Zones
- 1 (3 yr TOT)
- 2 (6 yr TOT)
- 3 (10 yr TOT)

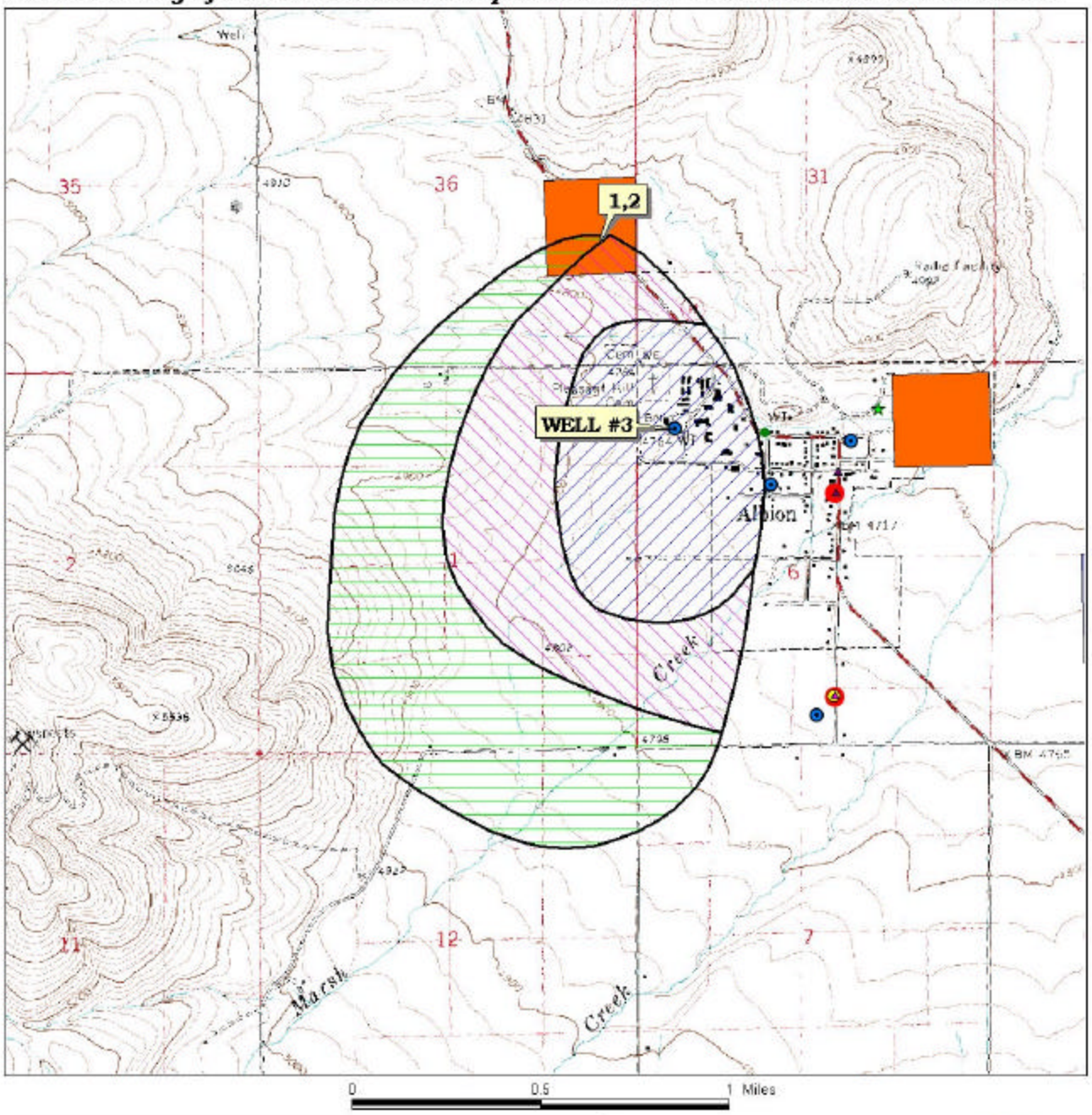
Wellhead
Enhanced Inventory
CERCLIS Site
RCRIS Site
Dairy
UST Site
Closed UST Site
Open UST Site
Business Mailing List
RPDES Site
Mine
AST
Toxic Release Inventory
SARA Title III Site (EPCRA)
Recharge Point
Injection Well
Group 1 Site
Cyanide Site
Landfill
Wastewater Land App Site

N

IDAHO DEPARTMENT OF ENVIRONMENTAL QUALITY

PWS# 5160001
WELL #2

FIGURE 4. City of Albion Delineation Map and Potential Contaminant Source Locations



PWS# 5160001
WELL #3

Table 2. City of Albion, Well #1, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone (years)	Source of Information	Potential Contaminants[2]
1, 3	LUST-Site Cleanup Completed, Impact: Unknown; UST-Closed	0 – 3	Database Search	VOC, SOC
2	UST-Closed	0 – 3	Database Search	VOC, SOC
4	Dairy <=200 Cows	0 – 3	Database Search	IOC, Microbials
5	SARA Site	0 – 3	Database Search	IOC, VOC, SOC
6	Landfill-Municipal, Closed	0 – 3	Database Search	IOC, VOC, SOC, Microbials
7, 8, 9	Lust-Site Cleanup Completed, Impact: Groundwater; UST-Open; Tire-Dealers-Retail	3 – 6	Database Search	IOC, VOC, SOC
10	Landfill-Municipal, Closed	3 – 6	Database Search	IOC, VOC, SOC
	Highway 77	0 – 10	GIS Map	IOC, VOC, SOC, Microbials
	Marsh Creek	0 – 10	GIS Map	IOC, VOC, SOC, Microbials
	Drainage Ditch	0 – 3	GWUDI Survey	IOC, VOC, SOC, Microbials
	Sewer Line	0 – 3	GWUDI Survey	IOC, VOC, SOC, Microbials

[1] LUST = leaking underground storage tank, UST = underground storage tank, SARA = Superfund Amendments Reauthorization Act

[2] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 3. City of Albion, Well #2, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone (years)	Source of Information	Potential Contaminants[2]
1, 3	LUST-Site Cleanup Completed, Impact: Unknown; UST-Closed	0 – 3	Database Search	VOC, SOC
2	UST-Closed	0 – 3	Database Search	VOC, SOC
4	Dairy <=200 Cows	0 – 3	Database Search	IOC, Microbials
5	SARA Site	0 – 3	Database Search	IOC, VOC, SOC
6	Landfill-Municipal, Closed	0 – 3	Database Search	IOC, VOC, SOC, Microbials
7, 8, 9	Lust-Site Cleanup Completed, Impact: Groundwater; UST-Open; Tire-Dealers-Retail	3 – 6	Database Search	IOC, VOC, SOC
10	Landfill-Transfer Station-Active	3 – 6	Database Search	IOC, VOC, SOC
11	Landfill-Municipal, Closed	3 – 6	Database Search	IOC, VOC, SOC
12	WLAP Site- Municipal	6 – 10	Database Search	IOC, VOC, SOC
13	Landfill-Transfer Station-Active	6 – 10	Database Search	IOC, VOC, SOC
	Highway 77	0 – 10	GIS Map	IOC, VOC, SOC, Microbials
	Marsh Creek	0 – 10	GIS Map	IOC, VOC, SOC, Microbials
	Drainage Ditch	0 – 3	GWUDI Survey	IOC, VOC, SOC, Microbials
	Sewer Line	0 – 3	GWUDI Survey	IOC, VOC, SOC, Microbials
	Vaughn Street	0 – 3	GWUDI Survey	IOC, VOC, SOC, Microbials
	Marie Street	0 – 3	GWUDI Survey	IOC, VOC, SOC, Microbials
	Whitman Street	0 – 3	GWUDI Survey	IOC, VOC, SOC, Microbials
	Olsen Street	0 – 3	GWUDI Survey	IOC, VOC, SOC, Microbials

[1] LUST = leaking underground storage tank, UST = underground storage tank, SARA = Superfund Amendments Reauthorization Act

[2] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Table 4. City of Albion, Well #3, Potential Contaminant Inventory

Site #	Source Description[1]	TOT Zone (years)	Source of Information	Potential Contaminants[2]
1	Landfill-Transfer Station, Active	3 – 6	Database Search	IOC, VOC, SOC
2	Landfill-Transfer Station, Active	6 – 10	Database Search	IOC, VOC, SOC
	Highway 77	0 – 10	GIS Map	IOC, VOC, SOC, Microbials
	Marsh Creek	0 – 10	GIS Map	IOC, VOC, SOC, Microbials
	Drainfield	0 – 3	GWUDI Survey	IOC, VOC, SOC, Microbials

[2] IOC = inorganic chemical, VOC = volatile organic chemical, SOC = synthetic organic chemical

Appendix B

City of Albion
Susceptibility Analysis
Worksheets

Susceptibility Analysis Formulas

The final scores for the susceptibility analysis were determined using the following formulas:

1) VOC/SOC/IOC Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.2)

2) Microbial Final Score = Hydrologic Sensitivity + System Construction + (Potential Contaminant/Land Use x 0.35)

Final Susceptibility Scoring:

0 - 5 Low Susceptibility

6 - 12 Moderate Susceptibility

≥ 13 High Susceptibility

Ground Water Susceptibility Report Public Water System Name : ALBION CITY OF Well# : WELL #1

Public Water System Number 5160001 1/23/03 11:56:29 AM

1. System Construction		SCORE				
Drill Date	No Date on well log					
Driller Log Available	YES					
Sanitary Survey (if yes, indicate date of last survey)	YES	1999				
Well meets IDWR construction standards	NO	1				
Wellhead and surface seal maintained	YES	0				
Casing and annular seal extend to low permeability unit	NO	2				
Highest production 100 feet below static water level	NO	1				
Well located outside the 100 year flood plain	YES	0				
Total System Construction Score		4				
2. Hydrologic Sensitivity						
Soils are poorly to moderately drained	YES	0				
Vadose zone composed of gravel, fractured rock or unknown	NO	0				
Depth to first water > 300 feet	NO	1				
Aquitard present with > 50 feet cumulative thickness	NO	2				
Total Hydrologic Score		3				
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score	
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2	
Farm chemical use high	YES	2	0	2		
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO	
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2	
Potential Contaminant / Land Use - ZONE 1B						
Contaminant sources present (Number of Sources)	YES	7	8	8	6	
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8	
Sources of Class II or III leacheable contaminants or	YES	9	8	8		
4 Points Maximum		4	4	4		
Zone 1B contains or intercepts a Group 1 Area	YES	0	0	0	0	
Land use Zone 1B	25 to 50% Irrigated Agricultural Land	2	2	2	2	
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	14	14	10	
Potential Contaminant / Land Use - ZONE II						
Contaminant Sources Present	YES	2	2	2		
Sources of Class II or III leacheable contaminants or	YES	1	1	1		
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2		
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0	
Potential Contaminant / Land Use - ZONE III						
Contaminant Source Present	YES	1	1	1		
Sources of Class II or III leacheable contaminants or	YES	1	1	1		
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1		
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0	
Cumulative Potential Contaminant / Land Use Score		26	24	26	12	
4. Final Susceptibility Source Score		12	12	12	11	
5. Final Well Ranking		Moderate	Moderate	Moderate	Moderate	

Ground Water Susceptibility Report Public Water System Name : ALBION CITY OF Well# : WELL #2

Public Water System Number 5160001 1/23/03 11:56:46 AM

1. System Construction		SCORE
Drill Date	10/10/66	
Driller Log Available	YES	
Sanitary Survey (if yes, indicate date of last survey)	YES	1999
Well meets IDWR construction standards	NO	1
Wellhead and surface seal maintained	YES	0
Casing and annular seal extend to low permeability unit	NO	2
Highest production 100 feet below static water level	NO	1
Well located outside the 100 year flood plain	YES	0
	Total System Construction Score	4

2. Hydrologic Sensitivity		
Soils are poorly to moderately drained	NO	2
Vadose zone composed of gravel, fractured rock or unknown	YES	1
Depth to first water > 300 feet	NO	1
Aquitard present with > 50 feet cumulative thickness	YES	0
	Total Hydrologic Score	4

3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2

Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	11	12	12	10
(Score = # Sources X 2) 8 Points Maximum		8	8	8	8
Sources of Class II or III leacheable contaminants or	YES	13	12	12	
4 Points Maximum		4	4	4	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	25 to 50% Irrigated Agricultural Land	2	2	2	2
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	14	14	10

Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0

Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		26	24	26	12
4. Final Susceptibility Source Score		13	13	13	12
5. Final Well Ranking		High	High	High	Moderate

Ground Water Susceptibility Report Public Water System Name : ALBION CITY OF Well# : WELL #3

Public Water System Number 5160001 1/23/03 11:57:06 AM

1. System Construction		SCORE			
Drill Date	Unknown				
Driller Log Available	NO				
Sanitary Survey (if yes, indicate date of last survey)	YES	1999			
Well meets IDWR construction standards	NO	1			
Wellhead and surface seal maintained	YES	0			
Casing and annular seal extend to low permeability unit	NO	2			
Highest production 100 feet below static water level	NO	1			
Well located outside the 100 year flood plain	YES	0			
Total System Construction Score		4			
2. Hydrologic Sensitivity					
Soils are poorly to moderately drained	NO	2			
Vadose zone composed of gravel, fractured rock or unknown	YES	1			
Depth to first water > 300 feet	NO	1			
Aquitard present with > 50 feet cumulative thickness	NO	2			
Total Hydrologic Score		6			
3. Potential Contaminant / Land Use - ZONE 1A		IOC Score	VOC Score	SOC Score	Microbial Score
Land Use Zone 1A	IRRIGATED CROPLAND	2	2	2	2
Farm chemical use high	YES	2	0	2	
IOC, VOC, SOC, or Microbial sources in Zone 1A	NO	NO	NO	NO	NO
Total Potential Contaminant Source/Land Use Score - Zone 1A		4	2	4	2
Potential Contaminant / Land Use - ZONE 1B					
Contaminant sources present (Number of Sources)	YES	3	3	3	3
(Score = # Sources X 2) 8 Points Maximum		6	6	6	6
Sources of Class II or III leacheable contaminants or	YES	7	3	3	
4 Points Maximum		4	3	3	
Zone 1B contains or intercepts a Group 1 Area	NO	0	0	0	0
Land use Zone 1B	Greater Than 50% Irrigated Agricultural Land	4	4	4	4
Total Potential Contaminant Source / Land Use Score - Zone 1B		14	13	13	10
Potential Contaminant / Land Use - ZONE II					
Contaminant Sources Present	YES	2	2	2	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Land Use Zone II	Greater Than 50% Irrigated Agricultural Land	2	2	2	
Potential Contaminant Source / Land Use Score - Zone II		5	5	5	0
Potential Contaminant / Land Use - ZONE III					
Contaminant Source Present	YES	1	1	1	
Sources of Class II or III leacheable contaminants or	YES	1	1	1	
Is there irrigated agricultural lands that occupy > 50% of	YES	1	1	1	
Total Potential Contaminant Source / Land Use Score - Zone III		3	3	3	0
Cumulative Potential Contaminant / Land Use Score		26	23	25	12
4. Final Susceptibility Source Score		15	15	15	14
5. Final Well Ranking		High	High	High	High